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The Wheat Industry in the United States

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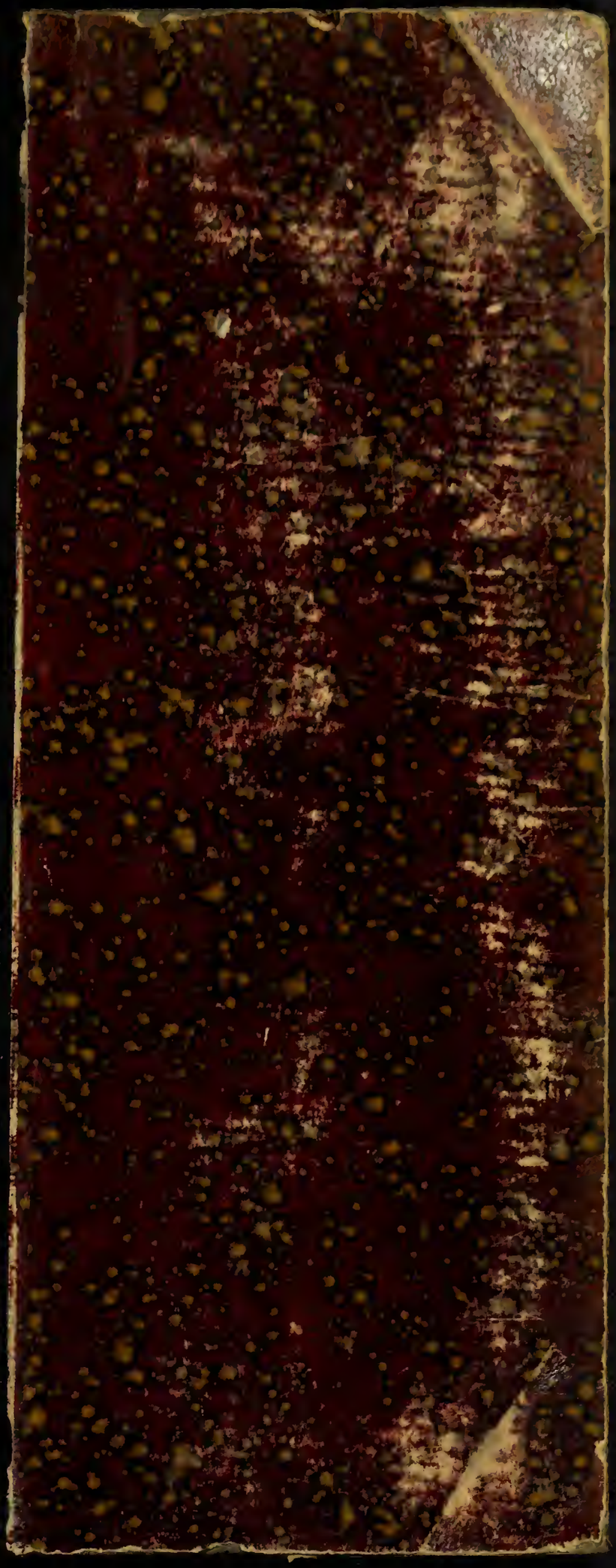

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THE WHEAT INDUSTRY IN THE UNITED STATES

BY

HENRY ELISHA GADDIS

THESIS

FOR THE

DEGREE OF BACHELOR OF ARTS

IN

BUSINESS ADMINISTRATION

COLLEGE OF LITERATURE AND ARTS

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May 29 1913

THIS IS TO CERTIFY THAT THE THESIS PREPARED UNDER MY SUPERVISION BY

Henry Elisha Gaddis

ENTITLED The Wheat Industry in the United States.

IS APPROVED BY ME AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE

DEGREE OF Bachelor of Arts

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THE WHEAT INDUSTRY IN THE UNITED STATES.

I. THE PRODUCTION OF AND THE KINDS OF AMERICAN WHEAT.

The United States has a larger production of wheat than any other single country in the world; so the machinery of the production and distribution of the product must of necessity be very extensive, and in some ways, complex. Much has been written on the different phases of the subject of wheat. The United States Department of Agriculture and the Bureau of Statistics have for many years collected statistics on the production and trade. A large part of one issue of "The Annals of the American Academy of Political and Social Science" was devoted to articles on the machinery for marketing the American agricultural products. Much of the material for this paper has been taken from these two sources.

The subject has been divided into five divisions: first, a statement of the production and a description of the different kinds of wheat; second, a description of the harvesting and threshing and of the handling of wheat in the country elevators; third, the handling of wheat in the primary markets, including a description of the operations on the grain exchanges; fourth, an account of the flour milling industry and the uses of wheat; fifth, our exports of wheat and the relations of foreign countries to the wheat industry.

Production in the United States. In 1911 the wheat crop of the country ranked fourth in value, being surpassed only by corn, cotton, and hay. The value was estimated at about $600,000,000. Below is a table showing the production in the United States for the twenty two years ending with 1912; the records are available for a much longer period, but this is

sufficient to show the present production and the general tendency.

Year.	Bushels.[1]	Year.	Bushels.[1]
1891	611,780,000	1902	670,063,000
1892	515,949,000	1903	637,822,000
1893	396,132,000	1904	552,400,000
1894	460,267,000	1905	692,979,000
1895	467,103,000	1906	735,261,000
1896	427,684,000	1907	634,087,000
1897	530,149,000	1908	664,602,000
1898	675,149,000	1909	737,189,000
1899	547,304,000	1910	635,121,000
1900	522,230,000	1911	621,338,000
1901	748,460,000	1912	730,267,000*

The accompanying graph of the production gives a better idea of the total production. It is easily seen that the general trend is upward; our banner crop year, 1901, has since been closely rivaled three times, in 1906, 1909, and 1912. The great variations between some of the years may be due to any combination of a number of contributing causes. Among these causes of variation are favorable or unfavorable weather conditions during seeding, growing, or harvesting times, high or low prices at seeding time, and the feeling of farmers toward wheat, due to the success or failure of the preceeding wheat crop.

Our minds cannot grasp from the bare figures the magnitude of the amount produced in one year. If all the wheat grown in the United States could be loaded onto a single train, it would take a train of cars about five thousand miles long, or long enough to reach one fifth of the way around the earth.

The following table of the production of the country by

1. From The Statistical Abstract of the United States, 1911.
* From The Supplement to the December Crop Reporter, 1912.

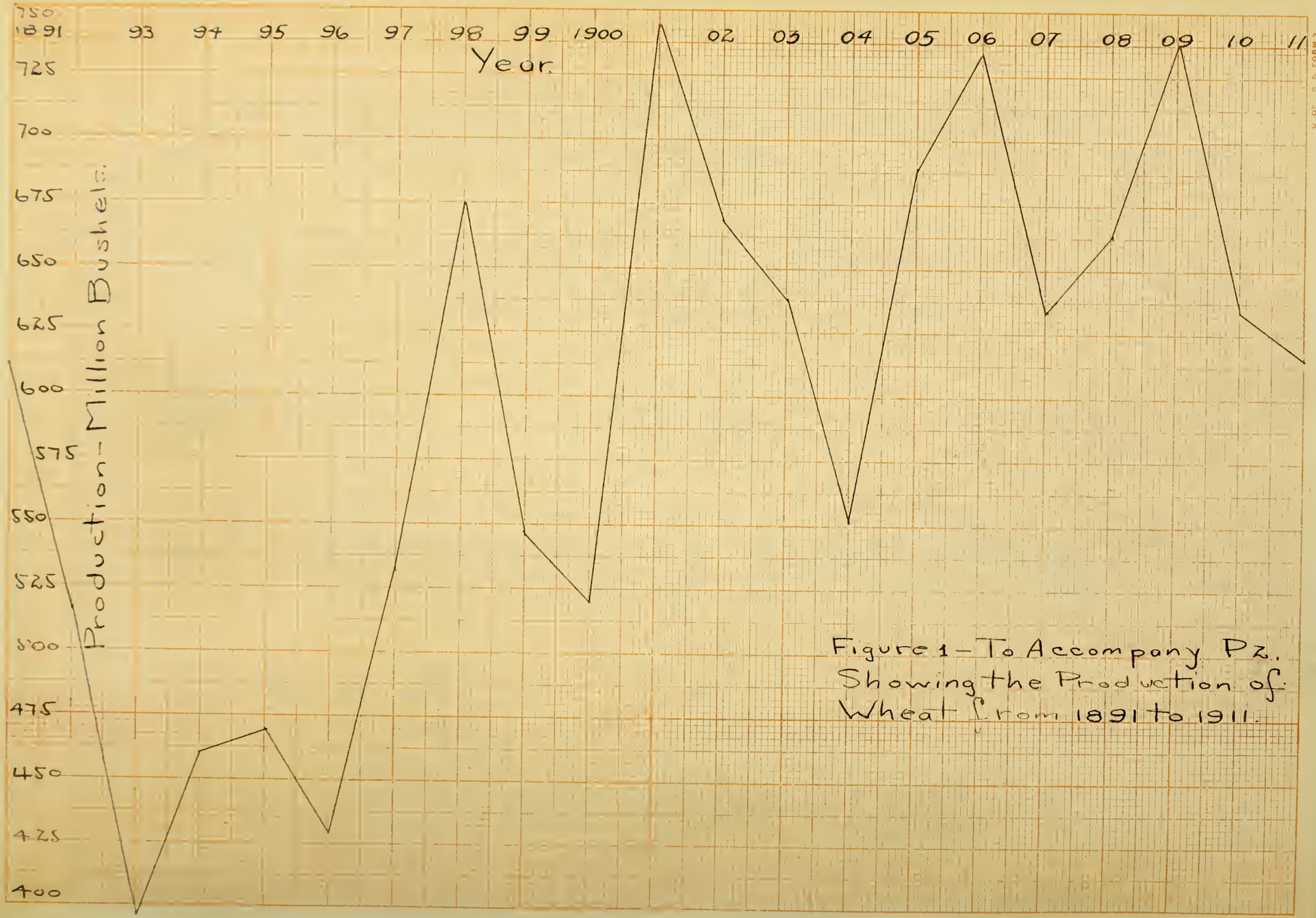

Figure 1 - To Accompany Pz. Showing the Production of Wheat from 1891 to 1911.

states for the years 1891 and 1911 will show in what parts of the country the greater part of the wheat was grown in those years:

State, or Territory.[2]	Winter Wheat. 1911. *	Spring Wheat. 1911. *	Total Wheat. 1911. *	Total Wheat. 1891. *
Maine		63	63	669
Vermont		28	28	392
New Hampshire				170
Connecticutt				31
New York	6,728		6,728	10,630
New Jersey	1,462		1,462	2,124
Pennsylvania	17,402		17,402	20,064
Delaware	1,887		1,887	1,250
Maryland	9,378		9,378	8,107
Virginia	9,000		9,000	7,651
West Virginia	2,737		2,737	3,423
North Carolina	6,636		6,636	4,975
South Carolina	946		946	992
Georgia	1,740		1,740	2,323
Ohio	36,240		36,240	45,531
Indiana	34,354		34,354	52,807
Illinois	42,000		42,000	35,025
Michigan	18,450		18,450	30,205
Wisconsin	1,575	1,522	3,097	13,043
Minnesota		43,935	43,935	55,333
Iowa	5,654	4,968	10,622	27,586
Missouri	36,110		36,110	25,732
North Dakota		73,200	73,200	52,105
South Dakota		14,800	14,800	29,714
Nebraska	38,474	3,100	41,574	18,080
Kansas	51,030	357	51,387	54,866
Kentucky	9,906		9,906	13,181
Tennessee	8,280		8,280	11,626
Alabama	345		345	2,251
Mississippi	108		108	483
Texas	6,580		6,580	6,435
Oklahoma	8,976		8,976	
Arkansas	1,008		1,008	2,236
Montana	7,259	5,040	12,299	1,856
Wyoming	624	1,170	1,794	110
Colorado	3,204	5,070	8,274	2,037
New Mexico	750	512	1,262	1,073
Arizona	750	50	80	395
Utah	3,000	2,025	5,025	2,393
Nevada	368	650	1,018	372
Idaho	10,930	4,930	15,860	1,811
Washington	25,116	25,545	50,661	12,216
Oregon	13,009	3,717	16,726	13,149
California.	8,640		8,640	36,595
The United States.	430,656	190,682	621,338	611,780

2. From The Yearbook of the Department of Agriculture, 1891 and 1911.

* 000 omitted.

The report of a single year indicates but in a general way the greatest wheat producing states, for there are marked variations from year to year. Almost every state in the country produces wheat to some extent, but two circles, the larger including the upper Mississippi valley and the valley of the Ohio, the other including the valley of the Columbia, will take in the greater part of the wheat growing land. Practically the same thing was true in the year 1891. A third region of lesser importance is the Atlantic Highland, which includes the Appalachian Mountains and the Alleghany Plateau, with the Costal Plain. The Pacific States are cut off from the rest of the country as effectively as if they were a separate country so far as the wheat industry is concerned. This is well shown by the fact that during the wheat famine in Australia a few years ago, the price of wheat in those states rose out of all proportion to the price in the rest of the country.

Kinds of Wheat. It would be strange if the same kind of wheat were grown in all parts of the United States. The wheats that are grown may be classified in several different ways: according to the season of planting they are either spring or winter wheats; according to the firmness of the seed they are either hard or soft; according to the color of the grain they are either red or white. From the standpoint of environment they may be classified as follows:

(1) Common bread wheats.

a. Soft winter wheats.

b. Hard winter wheats.

c. Hard spring wheats.

d. White wheats, very soft and starchy, either spring or winter sown.

e. The early wheats, soft or semi-hard.

(2) Club, or square head wheats. The grains are usually short, rather small, white or red.

(3) Durum wheats. These are the hardest grained wheats known, glassy, yellowish in color, sometimes tending toward red. They are usually spring sown.

Mr. Carleton, in his work, "The Basis for the Improvement of American Wheats",[3] divides the United States into eight divisions according to the type of wheat grown. This classification follows:

1. The soft wheat region, including the New England and the Middle Atlantic States.

2. The semi-hard winter wheat region, including the North Central States.

3. The southern wheat region, including the northern part of the Southern States.

4. The hard, "strong" spring wheat region, including the northern states of the Plains.

5. The hard winter wheat region, including the middle states of the Plains.

6. The Durum wheat and "dry farming" region, including a part of the southern states of the Plains.

7. The irrigated wheat and "dry farming" region, including a part of the southern states of the Plains.

3. Quoted by W.P.Rutter in "Wheat Growing in Canada, the United States, and the Argentine.

8. The white wheat region, including the larger part of the Pacific States.

The accompanying map shows this division of the country.

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THE UNITED STATES SHOWING DIVISIONS ACCORDING TO KINDS OF WHEAT.

FIG. 2.
TO ACCOMPANY
PAGE 6.

II. HANDLING THE WHEAT BEFORE IT REACHES THE PRIMARY MARKET.

Harvesting. In May of each year the harvesting of the wheat crop begins in Texas and Florida. In June harvest begins in earnest with the states of Louisiana, Mississippi, Alabama, Georgia, North and South Carolina, Tennessee, Virginia, Kentucky, Kansas, Arkansas, Utah, Colorado, and Missouri in the central wheat belt, and California and Oregon on the Pacific coast. In July the states of Nebraska, Minnesota, Wisconsin, Iowa, Illinois, Indiana, Michigan, Pennsylvania, Ohio, New York, and the New England States turn out their crops. With the possible exception of a small part of North Dakota, the harvesting of wheat in the United States is finished before the first of August.

In June there appears in the West an army of men, ragged and unkempt, but ready to work from daylight until dark in the wheat fields. These men are a part of the floating population of the country, who have no settled homes and go where ever they can get work. For three good meals a day, a pile of hay on which to sleep at night, and the liberal pay which the farmer is willing to give, these men will work from daylight till dark in the fields. This army goes north with the ripening of the crop, increasing as it goes, and disappears from the Dakotas into Canada in the latter part of the summer, only to appear again the next year.

Machinery. Great advances have been made in harvesting machinery in comparatively recent years, and it is due to this advance as much as to any other one cause that the United States is now the greatest wheat raising country in the world. A type much used on the wheat farms of the western plains is the "header".

This machine usually cuts the stalk about six inches from the head, but it may be set lower if the wheat is down or tangled. As it does not bind the grain, the wheat must be threshed at once; so it must be dry and hard when the harvesting begins. For this reason, this machine can be used only in climates in which the chances of rain during the harvest season are small, as in the states of our western wheat belt.

Another type of harvester that is used to some extent is the combined harvester-thresher. It cuts, gathers, threshes, and sacks the grain all at the same time, the only work required from man being the driving of the horses or steam engine and the tieing of the sacks. The harvester-thresher of the great "Inland Empire" east of the Sierras and the Cascades cuts a swath of from sixteen to forty two feet in width; it harvests from twenty five to forty five acres per day, and requires four or five men to operate it. The standard horse machine has a cutting bar of from sixteen to twenty feet. The steam propelled machine cuts a path of from twenty four to forty two feet, and, with a force of eight men to operate it, harvests from sixty five to one hundred twenty five acres per day.

The machine used in the harvesting of the crop in the central states and to some extent in the western states is the self binder. This machine, which is drawn by three or four horses, cuts a swath of about six feet. It is small enough to be used on ground that is fairly rough, so it is adopted for use on almost all wheat land. The wheat is cut and shocked some time before it is dry and hard enough to thresh. In the west, in order to economise time and avoid risk, the binder is taken into the field before

the grain is ready to cut with the header or with the harvester-thresher. One man to drive the horses and two to shock the grain can cut from ten to twenty acres per day.

Threshing. After the grain has been shocked for some ten days it is ready to thresh. In the western states, where the farms are usually large, a large number of the farmers own their own threshing machines. With half a dozen men with teams to haul the grain from the fields, men in the fields to pitch the wheat onto the wagons, men to operate the machine, and to haul the threshed grain to the graineries or to market, threshing is a busy time on the farm. Sometimes it continues for weeks at a time on a single farm. In the central states the farms are smaller, and the threshing is usually done by a traveling machine. The farmers help each other, exchanging work, and threshing time is looked on by many farmers as a gala season.

Transportation to the Local Market. In most localities of the United States the farms are near enough to the local market so the wheat can be hauled directly from the machine; and this is the usual practice. The grain runs from the machine into the bed of a wagon. As soon as it reaches the local elevator it is weighed and driven onto the "dump". The "dump" is an arrangement which either raises the front end of the wagon or lowers the rear, allowing the wheat to run out of the rear end into a "sink" in the elevator.

Country Elevators. The wheat is taken from the "sink", which is nothing more than a bin under the floor, by means of a conveyor to the "boot" of an elevator. This conveyor may be one of several types; it may be a "screw", a long revolving

bar with a plate fastened to it in such a way that the whole thing resembles a screw, and will push the grain through a trough. Or the grain may be pushed through the trough by means of an endless chain, attached to which are small paddles. The chain running the long way of the trough, pushes the grain with it; this is known as the "chain drag". The elevator "boot" is merely a sort of box through which a belt with steel cups passes. The wheat from the conveyor is poured into the cups as they pass, and carried in them to the top of the elevator; it is dropped from here, through spouts, into the bins, where it lies until the grain dealer is ready to sell. In the busy season the wheat does not usually lie long, for the dealer needs the money and will sell his grain as soon as he can get the cars. The usuall process of loading is for the wheat to be dropped from the bin into a conveyor similar to the one which carried it into the elevator, again carried to the top of the elevator, and dropped this time into a smaller bin which sits on a large pair of scales. When the "scale bin" is filled, a spout is opened and the wheat runs into the car. The spouts can be arranged so that a small amount of work in the car will make room for the thousand bushels which is the usual amount loaded into cars at the present time.

Up to a few years ago elevators were lacking on the Pacific coast; the wheat was handled in sacks; so in place of elevators, with machinery for handling wheat in bulk, all that was necessary was a number of warehouses. Sometimes these were merely sheds with open sides; sometimes the sacks were merely piled up in the fields until the farmer could take time to haul them to the railroad. However, within the last few years, elevators have

begun to spring up, and a part of the grain is now handled in bulk.

The elevators of the western and central states are owned and operated by three classes of persons: the line elevator companies, the local grain dealer, and the farmers' elevator companies. On the Northern Pacific railroad, which may be taken as typical of the Northwest, 57.9% of the elevators were operated by line elevator companies in 1900, 38.5%, by local independent dealers, and 3.6%, by farmers' elevator companies.[1]

The line elevator company is an establishment which has its headquarters in a primary market, and controls from there a number of elevators in the surrounding country. Each morning the price for the day is fixed in the central office and sent out to all the houses. This price is dependent upon the price at the primary market and the freight rate to the market, together with the profit of the company, which is usually three cents per bushel or less.

The independent dealer is one who owns one or two elevators at one point or at nearby points in the country. Since the independent dealer does not handle nearly so much grain as the line elevator companies, and the profit on the grain is sometimes taken up by competition or by reductions on account of poor grades, the independent dealers profit is sometimes very small.

Farmers elevators, as the name implies, are elevators owned by associations of farmers. When the independent dealer and the farmers' elevator company come into competition, the farmers' company has the advantage, for the farmer will naturally patronise

1. Industrial Commission, Report on Agriculture, Vol. 6.

the house in which he has an interest, either directly or indirectly. With two or three elevators in a small town, the competition is usually very strong. The farmer watches the newspapers closely and knows exactly what is the price of wheat in the nearest primary market. He often goes from one dealer to another in an effort to get them to bid against each other, and so raise the price of his grain.

In the Northwest, the number of farmers'elevators has been increasing in the past few years. Mr. Henry Fleif, Supervising Inspector of Country Elevators for Minnesota, writes: "There has been a very perceptible increase in the number of farmers' elevators in this state during the last five years, and a corresponding decrease in the number of line houses.----- As to the future of farmers' and line houses, I believe there is no doubt that the latter will decrease and the former increase in number." The following table shows the number of warehouses in the state of Minnesota for the years named:[2]

Style of elevator.	1906	1907	1908	1909	1910
Line houses	1199	1171	1007	971	871
Independent houses	381	377	430	405	363
Farmers' houses	151	168	178	205	224.
	1731	1716	1615	1581	1458

This table shows a marked decrease during the period of the line elevators, a smaller decrease of the independent elevators, and a tendency toward increase on the part of the farmers' elevators. However, the decrease in the line companies has far overshadowed the increase in the farmers companies.

We should not get the idea that all the relations of the

2. Quoted by Siebel Harris, in "Methods of Marketing the Grain Crop"; Annals of the American Academy, Vol. 38, Page 361.

competing grain dealers are those of strife. Grain dealers are organized into an association which is nation wide in its extent, the Grain Dealers' National Association. The local dealers belong to the various state associations, which are in turn affiliated with the national association. These associations were originally formed in order to get more favorable rates from the railroads and to improved the quality of the grain coming in from the farmers. Both these purposes have been carried out, as well as many others; the associations have succeeded in getting fair treatment at the primary markets in the way of weights, grades, and arbitrary dockage. In former times, the dealers at the primary markets were in the habit of taking off what they saw fit in the weights, and of reducing the price an unreasonable amount for a grade worse than the one contracted for.

Disposing of the wheat. The line elevator companies have their representatives in the primary market to sell the grain that is bought by the country elevators. But the business of the independent dealer or the farmers'elevator company is not large enough for this. So they must find another means. The selling for the independent dealer may be done in one of two common ways. The first, which is probably the more common in the central part of the country may be outlined as follows: The dealer in the country receives each business morning from the commission men and the dealers in the primary markets, bids for his wheat, to be delivered within a specified time, usually ten to thirty days. The dealer telegraphs an acceptance of this bid for the number of cars that he wishes to sell. If the dealer or the commission merchant receives the acceptance by the time specified, which is

usually from nine to ten o'clock in the morning, he fills out a contract of sale, sending it with billing instructions to his customer in the country. In the case of the commission merchant, he usually has orders to buy as much as he can up to a certain amount at a given price. All the grain that he buys is therefore shipped to the firm on whose account the purchase has been made. If the wheat has been bought by an elevator or a milling company, it is shipped directly to them.

The second way in which the local dealer may dispose of his wheat is by consignment; this method is less common at the present time than it was a few years ago. The dealer who consigns his grain merely loads it out and ships it to the order of a commission merchant in the primary market. The commission man sells the wheat on its arrival at the market price. As is easily seen, this is the most advantageous was of selling grain on a rising market.

When the local dealer ships a car of wheat either on the contract to deliver or for sale on track, he cannot wait for his money until the account is settled. So he draws a bill of exchange for the value of the wheat, leaving a margin of about ten percent, attaches it to the bill of lading, and deposits them in the local bank. Thus he is able to pay his customers in cash, which is almost the universal custom. The buyer will pay the draft on its arrival and receive the bill of lading. If the wheat is consigned to a commission merchant, he will charge the prevailing rate of interest for the time between the paying of the draft and the sale of the wheat.

Transportation to the primary market. The railroads carry

practically all the wheat from the country elevators to the primary markets, because the waterways of the country are not accessible for this traffic. So the producer gets practically no direct benefit from the canals, lakes, and rivers of the country. Since the rates by water are much smaller than the rates for the same distance by rail, the farmers of the country undoubtedly suffer a great loss from this lack of facilities for water transportation. The mean rate for hauling wheat from points subsidiary to Chicago to the market is sixteen cents per hundred pounds; the mean rate for hauling wheat from points in Nebraska, the Dakotas, and Minnesota to Minneapolis is the same. So we may be safe in saying that the average cost of transporting wheat from the local elevator to the primary market is about sixteen cents per hundred pounds, or about nine and one half cents per bushel.[3]

3. W.P.Rutter, "Wheat Growing in Canada, the United States, and the Argentine," Page 162.

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III. THE HANDLING AND DEALING IN WHEAT IN THE PRIMARY MARKETS.

The primary market. We have seen the wheat of a country neighborhood collected in the country elevator and sent on its way to the primary market. A primary market is a railroad center in which grain is first concentrated in large amounts in its movement from the producer to the consumer. Not nearly all the wheat raised in the country gets into the primary market, for part of it must be used at home, for seed, to feed the farmer's family, and for other uses. The following table shows the percentage of the wheat grown in each of the states which is shipped out of the county of growth in 1911.

State.	Percent.	State	Percent.
Maine	0	Nebraska	64
Vermont	0	Kansas	68
New York	26	Kentucky	30
New Jersey	31	Tennessee	30
Pennsylvania	32	Alabama	4
Delaware	65	Mississippi	0
Maryland	60	Texas	49
Virginia	30	Oklahoma	57
West Virginia	24	Arkansas	15
North Carolina	5	Montana	55
South Carolina	1	Wyoming	13
Georgia	3	Colorado	44
Ohio	45	New Mexico	17
Indiana	55	Arizona	15
Illinois	64	Utah	35
Michigan	50	Nevada	16
Wisconsin	24	Idaho	67
Minnesota	63	Washington	80
Iowa	56	Oregon	65
Missouri	52	California	60
North Dakota	59	United States	56

It will be seen, as will be expected, that the states which are the greatest producers of wheat also put the greatest percentage of their crop into the trade of the country. So putting these two facts together, we can at once point out the location

of the greatest primary markets. The receipts of these markets for the year 1911 are shown below:[2]

Minneapolis	97,148,920 bushels.
Chicago	37,118,100 ,,
Duluth-Superior	32,224,468 ,,
Kansas City	25,701,600 ,,
St. Louis	16,786,505 ,,
Omaha	12,184,800 ,,
Milwaukee	8,662,700 ,,
Toledo	6,602,000 ,,

Thus the greatest wheat market of them all is in one of the greatest wheat states, and the second market is so located that it draws from a great part of the western wheat country. As Chicago is typical of the primary markets of the country, we will take a car of wheat from its arrival in the yards and trace its progress through the city. Samples of wheat are collected from each car in the yards each morning by employees of the inspection department, called samplers; these samplers, who are experts on grain, try to get a sample which will be typical of the whole car. The sample is taken to a room of average temperature and humidity and turned over to another expert called the inspector. The inspector inspects it closely for moisture content, foreign matter, poor grains, and other things which bring down the quality of the wheat. Then he assigns the grade to the car which in his judgement its condition justifies.

The commercial grades of wheat recognized in Chicago are as follows:[3]

White Winter Wheat, Nos. 1,2,3, and 4.
Long Red Winter Wheat, Nos. 1 and 2.
Red Winter Wheat, Nos. 1,2,3, and 4.
Hard Winter Wheat, Nos. 1,2,3, and 4.
Colorado Wheat, Nos. 1,2, and 3.
Northern Spring Wheat, Nos. 1 and 2.
Spring Wheat, Nos. 1,2,3, and 4.
White Spring Wheat, Nos. 1,2,3, and 4.

2. Statistical Abstract of the United States, 1911, Page 523.

3. W.P.Rutter, Wheat Growing in Canada, The U.S. and Arg. P. 201.

Wheat of very poor quality is classified as "rejected" or "no established grade". If the inspector has difficulty in classifying the wheat, he takes it to the chief inspector, a man of long experience in the grain business. Often the whole force of inspectors is called in to judge a single sample of wheat. The method described above is known as room inspection; it has a great advantage over the old method of side inspection, in which a single inspector went into the railroad yards, climbed into the car, and gave the grain a grade. Room inspection insures uniformity of grade for all cars in the same market at least. Of course, grading depends more or less on the individual judgement of the inspector, and can never become an exact science like mathematics, but the room inspection method as used in Chicago is the nearest approach to that condition yet found.

After the grade has been determined and noted on a card, the card and grain are passed on to the record writer, who records the car number, the railroad over which it came into the city, the date, and the grade. The sample is then sent to the splitting department, where it is divided into two parts; one of these parts goes to two inspectors who verify the correctness of the first inspection, then to the person or firm who has the car in charge in the market; the other sample is put into a sack and hung on a rack for twenty four hours, in order to correct any mistakes that might have been made.

Inspection in other markets. Inspection, or classifying grain into grades, arose in Chicago in 1858. Grading has been one of the principal factors in making wheat and other grains the liquid commodities that they are at the present time in

this country. At first the inspection was done by a private party, working for himself; his certificates of grade were valued according to his personal integrity and ability. This system was not satisfactory. In 1871 the legislature of the state of Illinois passed a law providing for state inspection; Missouri, Minnesota, Kansas, and Indiana followed, so now many of the great primary markets have state regulated inspection. The Atlantic and Gulf ports and the primary markets of Detroit, Toledo, Cleveland, Cincinnati, and Buffalo have recognised systems of inspection, usually, if not universally, regulated by the boards of trade of the separate cities. Since uniformity has been recognised as a necessity from the first, practically the same rules have been adopted all over the country, changed to some extent by local conditions. These changes, small at first, have grown or increased in effect as the trade became larger. A few years ago the Grain Dealers' National Association set itself about to remedy this condition, and they have been very successful.

Functions of inspection and grading. The three principal functions of inspection and grading are:

They determine the quality of the grain, leaving only the price and time of delivery to be decided upon.

They afford a basis for time contracts, the importance of which will appear later.

They allow producers to receive a price nearer the real value of the grain. The dealers are relieved of a great part of the uncertainty of buying, for they can discount the poor grain and pay the full price for that which is of good quality.

Weighing. Each car is weighed by the railroad company in order to determine the amount of the freight; but it is weighed again "officially" in the primary market in order to complete the settlement between the seller and the buyer. In some markets it is the custom to weigh the grain "unloaded", that is, to weigh it as it is unloaded into the elevator; in others the weight of the car and grain is taken, then the weight of the car is taken after the grain is unloaded. The difference between the two is the weight of the grain. The weighing department gives the buyer a certificate of weight, showing the amount of grain in the car, the condition of the car, and any evidence of loss on the road. This "official" certificate is the basis of all settlements, unless the grain is shipped to a market at which there is not enough business to maintain a weighing department. This condition arises in a very small number of cases.

Unloading. When the wheat has been inspected and weighed it is ready to be unloaded. This must be done in a short time on account of the large number of cars that are received at an elevator in the course of a busy day. The usual method is to have a large scoop, run by machinery but guided by hand, to scrape the grain out of the car door into a pit; this pit is covered with grating to keep out foreign bodies, but to allow the grain to get in. At the bottom of the pit is a conveyor, much like the one used in the country elevator, but of course much larger, which takes the wheat to an elevator. The elevator takes it to the top of the house, and thence to the proper bin. In some of the elevators of the country, a train of eight or ten

cars is unloaded and taken out of the way in less than ten minutes.

Elevators. There are two main classes of elevators into which the wheat may be unloaded; the one is the public elevator, in which grain is stored for any one who presents it at a certain price per bushel; the other is the private elevator, in which grain is stored for use by the owner, as in the case of a miller or a brewer. The elevator capacity of the primary markets has increased greatly during the past decade. Following is a table showing the storage capacity of the elevators at the principal primary markets:[4]

City	Year	Elevators	Capacity in bushels.
Chicago	1908	77	54,245,000
Minneapolis	1909	49	40,905,000
Duluth-Superior	1908	24	30,175,000
St. Louis	1909	38	11,552,000
Kansas City	1909	34	11,110,000
Omaha	1908	15	6,040,000
Milwaukee	1909	5	4,350,000.

Regulation of the storage elevator. In order that grain warrants may be delivered in connection with exchange transactions, they must never be questioned. In order to bring this about, the exchanges conduct a strict supervision over the elevators. Only those which have been able to pass the inspection of the exchange can have their warrants delivered on the exchange. The owner of the elevator must have the highest financial standing, his books must be open to the representatives of the exchange, and the elevator must be in a convenient location, easy of access both for grain coming into and going out of the market. Unless these provisions are complied with, the elevator is not regular and its warrants will not be accepted on the floor of the exchange.

4. Report of the Comm. of Corporations. Trans. on Land and Water.

Storage receipts. The development of the idea of storage receipts has played almost as large a part in the development of the trade in wheat as has the development of inspection and grading; the two go hand in hand. The storage elevators in Chicago are compelled to accept grain for storage from any one who presents it, so long as they have room for it. The grain of the different owners is not kept separate, but all of the grain of one grade is stored together. In this way the grain loses its identity, but on presentation of the warehouse receipt the operator of the elevator is forced to turn over the same amount and grade of grain as was deposited. The exchanges usually prescribe that the receipts from a given firm shall be numbered consecutively, shall be good only for one year, that they shall stipulate the name of the elevator, the quality of the grain received, and the liability of the elevator company regarding fire, heating, and other risks. The delivery of one of these receipts, which are payable to the holder in much the same way as a check, after the payment of the storage charges, constitutes the delivery of the grain represented. This negotiability of the receipts allows the grain represented to enter into trading in a systematic way. The profit of the storage or terminal elevator company comes from always having the elevators full, for the greatest source of profit is the storage charge; therefore, in some cases it is necessary for them to go onto the market and buy wheat with which to fill their houses; they sell the wheat for future delivery, as will be explained later, for an advance great enough to cover the profits of storage. So their business is storage, and not trading in wheat.

Mixing. Another source of profit to the terminal elevator company is mixing grain. This can be done only if the grain is owned by the elevator company, for the laws of the states prohibit the mixing of grain belonging to another. Mixing is the putting together of grain of different grades in an attempt to make them both of the higher grade. For instance, an elevator company has several thousand bushels of No. 1 Northern spring wheat and the same amount of No. 2 Northern spring wheat. If the No. 1 is very good, and the No. 2 is just below the line, the two grades can be run together and mixed thoroughly, so that the whole lot comes within the class of No. 1. Since the difference in the prices of the two grades is one or two cents, the profit from this operation will be large. Mixing is beneficial to the farmer as well as to the terminal elevator company, for the elevator company, knowing that it can mix the poor grain with some of a higher grade and bring the whole up to the higher standard, will be willing to pay more for the low grade grain. Mixing is also do to some extent by the operators of country elevators, but of course it is on a much less exact basis.

Cleaning. A large part of the grain coming into the primary markets is mixed with dirt, weed seed, and other foreign matter. As soon as the wheat arrives in the terminal elevator the wheat is cleaned. The grain is run through a cleaner, which is constructed in such a manner that the large bodies are screened out by one screen, the smaller ones by another, and the bodies that are of the same size as the wheat grains, but of a lighter weight are blown out by a strong blast of air. This blast removes the blighted grains of wheat and pieces of straw. The

large screen takes out the large pieces of straw, and the small one the fine dirt, the weed seed, and the cheat.

Exchanges. Up to this time we have paid no attention to the ownership of the wheat. But the ownership of wheat in the primary market is probably one of the most interesting thing about the commodity. The ownership of the wheat depends upon the operations of the boards of trade, or produce, or grain exchanges, as they are variously called. A produce exchange may be defined as an "organized market place which enables people to buy and sell freely certain commodities, either in person or through a broker; and which, in order to facilitate such trade has for its fundamental objects the promotion of uniformity in customs and usages, the inculcation of principles of justice and equity in trade, the facilitation of the dissemination of valuable commercial and economic information, and the securing to its members the benefits of cooperation.[5] The exchanges do not enter into the trading, but merely provide a place in which its members may trade, and prescribe rules for the trading.

Method of trading. At first the head of the exchange called off the amounts of grain that the operators wished to sell or buy, much as an auctioneer cries a sale. But when the business increased to such an extent that this was impossible, the operators themselves went onto the floor and began trading among themselves. Now, with all the confusion it is impossible to make written contracts, so a large part of the business is conducted with signs. A broker who has five thousand bushels of

5. S.S.Huebner, Grain Exchanges, in Annals of the American Academy of Political and Social Science, Volumn 38, Page 3.

wheat for sale at a certain price will indicate that fact by means of a signal that all the operators understand; if anyone wishes to buy this amount at the price, he makes a signal to the effect, the two make hasty entries on their pads, and go about trying to make another sale or purchase.

Regulation of the exchanges. Many questionable transactions and practices may arise in the free buying and selling of large amounts of grain. So certain rules are laid down for the regulation of brokerage transactions; these rules, as has been said before, as practically the same for all exchanges. Expulsion is the penalty for failure to comply with the terms of any contract, or with the award of any committee of arbitration, or a violation of any of the rules of the exchange. The principal rules of the grain exchanges may be summarized as follows: No member shall make or report any false transactions, or be guilty of bad faith in any transaction, or act as agent for both the seller and the buyer, or be both principal and agent in the same transaction. He must not deal in differences, or be connected with any bucket-shop.

Sources of information in produce exchanges. In order for the members of the produce exchanges to carry on their business properly, they must be well informed as to what is going on all over the world. Some of the sources of their information are given below:

The Department of Agriculture publishes monthly reports as to the acreage, condition in field, visible supply in farmers' hands, average yield, and other information concerning the crops of this country.

Grain exchanges and allied organizations publish daily the amount of business, receipts, shipments,and supply in the elevators in their own city, and some attempt to compile statistics on the total supply in the country.

Commercial agencies collect figures on the visible supply of grain in markets, and on the general condition of business. The greatest organization of this kind in the world which deals with grain exchanges is Broomhall's Agency, of England. Any change in conditions or weather in any part of the world is cabled at once to the general office in Liverpool by the local offices, and from there it is cabled to other branch offices, and given by them to the grain exchanges. The Chicago Board of Trade, The New York Produce Exchange, The Buenos Ayres Grain Exchange, and The Liverpool Grain Exchange all receive information from this agency. Dun's and Bradstreet's in this country do this kind of business to a smaller extent.

Grain firms often employ experts to compile statistics for them. Some of these experts, as Mr. B.W.Snow, of Bartlett, Frazier and Co., New York, have elaborate systems for collecting this information. Others get the information desired by actual traveling. Collectively, these men play an important part in getting the information to the grain exchanges.

"Cash transactions". There are two types of transactions used on most of the large grain exchanges of the country: "cash" or "spot" transactions, and "futures". A cash transaction is merely the outright sale and purchase of goods for immediate delivery. Such a transaction does not necessarily imply a cash payment, as the parties may make their own arrangements as to

settlement, but it does represent, however, actual goods available on the market at the time. "Spot" dealings may be purely speculative, as where a dealer buys and sells in order to profit by the fluctuations of the market, or buys in order to hold for some time and profit from an expected rise in the market. The original purpose of grain exchanges was for trading in "cash" grain, and at the present time, only the larger exchanges have provisions for trading in "futures".

Futures. The financial page of almost any newspaper contains daily something like the following:

	Wheat.			Closing.	
	Open	High	Low	Apr. 21	Apr. 19.
May	92 1/4	92 1/2	92	92 3/8	92 1/8
July	91 3/8	91 3/4	91 1/8	91 5/8	91 3/8
Sept.	90 1/4	90 7/8	90	90 7/8	90 1/4

It means that dealers in a certain place, Chicago in this instance, are selling wheat for delivery in the months named at a price agreed upon. In the case of May wheat, they are selling wheat for delivery in May at prices ranging from 92 to 92 1/2 cents. Many of the dealers who sell for future delivery do not have the wheat when they sell it, and depend upon buying it later to fill their contracts. This is called "selling short". The sales on the board of trade, unless specified,are for "contract grade", which is fixed by the exchange. In Chicago, No. 2 Red winter wheat, No. 1 Northern spring, and No. 2 Hard winter wheats are contract grades. A large latitude is allowed to "short sellers" in this matter, for lower grades can be delivered on contracts at a specified discount, in case the grade sold or the contract grade cannot be procured; this provision is to prevent the cornering of any certain grade of wheat. The men who try to raise the price or are hoping for a raise in price

of wheat or other commodity on an exchange are known as "bulls". Those who are selling with the hope that the price will go down are known as "bears"; "short sellers" are always "bears".

Professor Emery, in his book, "Speculation on the Stock and Produce Exchanges of the United States" defines a future as follows: "A 'future' is a contract for the future delivery of some commodity without reference to specific lots, made under the rules of some commercial body, in a set form, by which the conditions as to the unit of amount, the quality, and the time of delivery are stereotyped, and only the determination of the total amount and the price is left open to the contracting parties".

Long before the time for delivery comes, the greater part of those who have sold wheat for future delivery will probably have bought enough of the same option to cover their sales, and will have realized their profit or loss in the transaction. That is, a man who sold in December for delivery in May will have bought of another man an option for delivery in May, and he is relying on the seller of this wheat to cover the contract he has made. These contracts may never be actually filled, and in all probability they never will be; but the purchaser has a right to insist on the delivery of the actual grain, or what is the same thing, the receipts of the terminal elevators. There are perhaps two in the line of buyers and sellers who will insist on the actual delivery of the grain, a dealer at the first who has the wheat to deliver, and one at the end who wishes to use the wheat. All those between these two merely pass the receipt on to the next man.

Privileges. A third form of transaction that is used to

some extent on grain exchanges is the "privilege". A privilege is a contract that gives the buyer the right to compel delivery or to compel buying, as the case may be, within a certain specified time. There are several forms of "privileges", the "put" and the "call" being the most common; in the put, a dealer pays a certain amount for the right of forcing the seller of the privilege to buy wheat at a specified time and price. For instance, a man might buy the right to demand that another buy five thousand bushels of wheat from him at any time during the month of May at 95 cents per bushel. With this contract back of him, the buyer of the"put" may go ahead in another contract and buy five thousand bushels at something less than 95 cents, being insured against loss by the right to sell the wheat at 95 cents if he wishes. A "call" is just the opposite of a "put". A man buys the right to buy five thousand bushels of wheat sometime during the month of May; then he is safe in going ahead and selling the wheat, being assured that he can get the wheat if he desires. A combination of the "put" and the "call" is called a "straddle". Privileges have been illegal in Illinois up to this session of the legislature(1913), which made them legal. This disfavor under the law has been due to the ease with which "privileges" could be used for speculative purposes. One who sells a priv lege may very easily be merely betting that the market takes a certain turn or that it does not take that turn. But if it is conducted rightly, it is as legitimate as any other trarsaction on the exchange.

Margins. In order to protect both parties to the contract, exchanges authorize both parties to demand a deposit of a margin

equal in most cases to about ten percent of the value of the wheat bought or sold, subject to increase or decrease according to the fluctuations of the market. In case of the non-fullfilment of the contract by either party, the margin becomes available to the other. Thus, in case the seller does not deliver the grain, the buyer can take the margin to cover the difference in price and buy the wheat that he wishes on the market. The depositing of margins is in effect the same as borrowing money and paying cash for the option bought.

Hedging. Hedging is the practice of making at about the same time, two contracts of an opposite though corresponding nature, the one in the trade market, the other in the speculative market. For example, a dealer buys ten thousand bushels of wheat at $1.00 per bushel; he borrows up to 90% of its value, depositing the elevator receipt as collateral. In order to protect himself from a drop in the price, he sells for future delivery an equal amount. When he sells the grain he actually holds, he must go onto the market and buy an option to cover the one he has sold. In the meantime, he makes the trade profit on the wheat. If the dealer were a terminal elevator company, his profit would come from the storage; if he were a miller, the profits would come from grinding the wheat into flour. Were it not for hedging, the farmers would not be able to dump their large crops on the market all at once and realize anything near their value; for the men who hold the wheat cannot afford to take the risk of loss that would be ever present if they could not hedge their holdings properly. Hedging is a form of insurance; the men who are in the business for the trade profit are assured of that

profit; those who are in the market for the speculative profit, and whose business it is to take the risks of holding the grain, take those risks. They are willing to do so, and it is their function. As was said before, dealers almost always hedge their sales. So every time wheat passes from one man to another, a transaction in futures occurs. This accounts for the large number of the so called fictitious transactions on the boards of trade; many illustrations may be cited where, in passing from the farmer to the consumer, wheat was hedged half a dozen times, and each hedging transaction involves two deals, first a sale and later a purchase.

The relations between the bankers and the grain buyers. It is an impossibility for the men who hold large quantities of wheat to have all the capital that is necessary for this operation. So it is necessary for them to borrow the money. This is a very easy thing to do for the banks are willing to take "grain paper", especially when it has been properly hedged. The operation is something as follows: The dealer has $10,000 with which he buys 10,000 bushels of wheat. He deposits the wheat in a public elevator, taking the receipt to the bank as collateral, borrows $9,000, and buys another 9,000 bushels of wheat. This operation is continued until the greater part of the dealers capital is taken up in margins. It can easily be seen that the amount of wheat will be much larger and the profits correspondingly greater than if the money could not be borrowed so easily. The deposit of the elevator warrants gives to the grain the same mobility as is given to corporate capital by the issue of stocks and bonds. If the margin of a loan gets low and the borrower refuses to

increase it, the banks may take the warrants onto the market and sell them, thus securing their loans before loss is sustained.

Speculation. It has been said often that speculation is nothing more or less than gambling. Mr. Emery brings out the distinction very clearly; he says,[6] "Speculation is a transaction in which one acquires by purchase the right to a certain property, (not specifically designated perhaps) and gains (or loses) for himself the difference between the alue of the property at the time of sale and its value at the time of the purchase. Gambling is a transaction in which one party pays over a sum of money from his own wealth because of the occurrence of a chance event." In speculating on the boards of tra e, the speculator actually acquires title to the wheat, or at least, he acquires the right to demand that title. He buys the wheat just as much as the real estate dealer goes out and buys a farm or a lot in a city, and he has the same purpose in view, namely,to profit by the increase in value of the property.

The services of speculation. It has been found desireable for the consumer and the producer to leave the risks of distribution to a special class who keep informed as to the factors, past, present, and prospective, which affect the prices of commodities. By collecting information concerning the supply and demand of wheat, the speculators are able to regulate the price and prevent large and sudden fluctuations. If the speculators get information that the weather in Argentine is ruining the wheat crop, they will begin at once to buy wheat; this demand will raise the price at once, and the consumption of wheat will be cut down.

6. Emery, "Speculation on the Stock and Produce Ex. of U.S.

The work of directing the course of the wheat is another great service of the speculative market. A demand comes from some place for wheat; if this demand is greater than the demand from another place, the price offered will be greater, and the wheat will go where the price is higher. It is impossible for the producer to be in touch with all the consumers, so the speculative market acts as a middle party, and directs the wheat in the right direction. The speculative market in wheat allows the producer to sell when he wishes, and the consumer to buy when he needs the goods.

Services of a continuous market to the miller. Most millers do not have sufficient storage space to allow them to keep the grain that is necessary to cover contracts for the future delivery of flour. So what the miller does is to go onto the market and buy wheat for delivery during the month before the flour is to be delivered. As we have seen before, this takes away all the risks of loss on account of fluctuations in the price of wheat, and assures the miller of his trade profit. In this case, as in many other, the miller entered the speculative market in order to do away with speculation.

Path of wheat through the primary market. We can now go back to the wheat that came into the city during the busy season of the summer; we have seen that a part of it is stored in the storage elevators and held there as a basis for the trading on the board of trade. This wheat may be owned all the time by the same man, but it may be used as a basis for trading to an amount out of all proportion to its value. The wheat that came in may have been sold at once to a miller; in that case, the wheat was

stored in the elevator in connection with the mill. After it was ground, it entered into commerce as a different product. A part of the wheat might have been sold at once to those who wish to ship it to eastern or foreign ports, or in the course of the trading it may have come into the hands of those persons.

Transportation to the seaboard. There are three ways in which grain may be taken from Chicago to the seaboard. First, it may be taken by lake and canal to New York. The traffic on the lakes is very heavy; the vessels are built especially for the traffic in grain. Usually they are large barges with straight sides, blunt bow and stern, and a large hold. These boats are moored alongside of the elevators in Chicago and filled in a few hours. Boats on the lakes are ice-bound for about one hundred and fifty days out of each year, and the owners, trying to make use of all the time they can, get into Chicago and load up during the winter. When the ice breaks, they start for the east with their loads of wheat. The importance of the lake traffic may be judged from the fact that in some months as much as 15,000,000 bushels of grain passes through the "Soo" canal. The greater part of this is wheat eastbound. This wheat is mostly transferred at Buffalo or some other port at the east of the lakes to cars which carry it to the seaboard. In 1911, the receipts of wheat at Buffalo were 68,474,400[7] bushels, a large part of which came by boat. In 1908 the rate on wheat from Duluth to Buffalo was one cent per bushel,[8] but this is an unusual thing; the rates depend upon the amount of freight waiting to be hauled.

7. Report of Merchants Exchange of St. Louis, 1911.
8. Report of the Committee of Corporations, "Transportation by Water and Rail, Vol.3, Page 331.

The wheat belt of the United States is well supplied with railroads, among which are the Great Northern, The Burlington, The Northwestern, The Northern Pacific, and The Atchinson. The rates of freight on wheat, as well as the other commodities have decreased materially in the last half century, owing to this increase in the facilities for hauling freight. In 1859 and 1860, the average rate per ton per mile on American railroads was three cents; forty years later, the rate for the same service was four fifths of one cent. In 1860 the average rate for carrying a bushel of wheat from Chicago to New York was 38 2/5 cents; for the year 1897 the rate was 12 1/3 cents; in 1911 the rate was 9.69 cents for wheat for domestic consumption, and 7.8 cents for wheat for export.[9] As we have seen, the rate by water and rail is sometimes much smaller than this.

In recent years, much grain has been exported from Galveston and New Orleans. These ports are as near to the great wheat belt as the eastern ports, and they have the advantage of being connected by railroads which are not so busy during the wheat season. Distance from the primary market to the seaboard, freight rates, and port facilities are important factors in determining the route that the wheat will take to the seaboard. The Gulf ports have the advantage over the eastern ports in the matter of freight rates, but the eastern ports have the advantage in the rates to Europe, and also in the fact that the climate is cooler and the wheat is not so apt to deteriorate as it is in the southern ports.

The man who ships wheat from Chicago or other western city

9. Statistical Abstract of the UNited States, 1911, Page 315.

to the east does so in about the same manner as the country elevator operator ships his wheat to the primary market. He loads the car or boat, bills it to the purchaser in the east, and draws a draft on him, attaching thereto the bill of lading. The only difference between the two is that the dealings between the primary markets and the seaboard are usually larger than those between the country dealer and the primary market.

We have said little so far about the dealing in wheat on the Pacific coast. Although, as we have seen, the states of the Pacific group are large producers of wheat, the method of handling the grain is far behind the method used in the central states. The greater part of the wheat is handled in sacks; this is a much more laborious method than the one used east of the Rockies. In place of elevators, we see ware houses and even open platforms on which the grain may be stored, and protected from the weather by board roofs and canvas. Most of the wheat in the eastern Washington and western Idaho district was formerly carried to the primary market by steam trains, as is the practice all over the country. But since 1907 the electric lines, especially the Spokane and Inland Electric Railway, have been taking a share of the business. The Columbia River also comes in for a share of the transportation to the seaboard. The river runs through canons for a part of the way, and here the method of loading is necessarily expensive; the wheat must be lowered in sacks to boat landings on the banks of the river, sometimes one thousand feet below the surface of the surrounding country; the cost of this ranges from one and one half to three cents per bushel.

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IV. MILLING AND THE USES OF WHEAT.

The per capita consumption of wheat at the present time in the United States is about six bushels per year. It has been estimated that about two thirds of this is ground into flour. In order to grind four bushels of wheat for every man, woman, and child in the United States, there must be a large industry. The milling industry comes among the first in every state of the country.

There are three steps in the development of milling to its present perfection. The first method known to have been used was the mortar and pestal type; the grains were rubbed to powder in a hollow bowl, in much the same way as the modern druggist pulverizes crystals. At the time this method was used, the flour for the family was all ground in the home, and the flour was not nearly so palatable as the product of the present day. The next step in the development of the process was the use of mill stones; the wheat is ground by passing between two stones, one of which is revolving within a hollowed out space of the other; the mill stone is still used in a few small mills in the undeveloped part of the country, but they have about died out.

The roller process. The process most used at the present time is the roller process, a short description of which follows: The first thing that is done is to clean the wheat; this is done in the same way as in the terminal elevator, as described above; an additional machine, the one for removing cockle, does a very important work. This machine has a revolving cyllinder, in which are holes just the size and shape of a cockle seed. As the wheat goes through the cyllinder, the cockle seed drops into the

holes, is carried over, and drops of its own weight into an aporn for the purpose.

After the grains have been thoroughly cleaned, brushed, and washed, they are run through a succession of rollers, which mash and tear the grains into flour. The different grades of flour, the "middlings", and "bran", are bolted out as the process goes on. In the various reductions, about seventy percent of the original wheat is saved for flour, and the remaining thirty percent goes to make up food for cattle and other stock. This, in general, is a description of the process as it is now carried on, allowing for variations on account of the size of the mill or other cause.

Production of flour in the United States. We give below the statistics of milling, compiled from the reports on manufacturing of the Census of 1910.

State	No. mills.	Product,	State	Mills.	Product.
Alabama	72	$2,779,274	Nebraska	249	17,836,000
Arizona	10	1,317,000	Nevada	8	398,000
Arkansas	13	5,615,486	N. Hamp.	105	3,187,000
California	125	25,188,133	N.Jersey	238	5,538,000
Colorado	77	7,868,000	New York	983	69,802,000
Conn.	98	2,024,000	N. Car.	249	8,501,000
Delaware	65	1,752,000	N. Dakota	84	11,685,000
Florida	6	164,000	Ohio	673	48,093,000
Georgia	105	8,000,000	Okla.	295	19,144,000
Idaho	57	2,480,000	Oregon	114	18,881,000
Illinois	461	51,111,000	Pa.	1450	44,783,000
Indiana	563	40,541,000	R.I.	18	886,000
Iowa	277	12,871,000	S.Carolina	10	351,000
Kansas	501	68,476,000	Tenn.	454	29,070,000
Kentucky	440	22,365,000	Texas	238	32,485,000
Louisiana	11	943,000	Utah	60	3,131,000
Maine	173	4,507,000	Vermont	133	4,133,000
Maryland	295	9,268,000	Virginia	458	17,598,000
Mass.	120	4,632,000	Wash.	96	17,853,000
Michigan	520	34,861,000	W. Va.	207	7,696,000
Minn.	322	139,136,000	Wisconsin	322	31,667,000
Mississ.	13	153,000	Wyoming	13	746,000
Missouri	680	44,508,000			
Montana	12	2,175,000	U.S.	11,578	883,606,893.

As we see from the table, Minnesota stands far ahead of any other state in the value of its products; New York stands a poor second, with a little more than half the output; Kansas is a close third, with Illinois and Ohio following in order. Thus we see that a large part of the wheat grown in the country is milled before it leaves the state in which it was grown, for the greatest wheat raising states are also the greatest milling states.

In 1899, there were 25,258 flour mills in the United States, 8,987 of which were in states having a flour production of $1,000,000 or over;[2] in 1909, there were only 11,578 mills in the United States, 11,499 of which were in states having an output of $1,000,000 or over. This shows a strong tendency toward concentration of the flour milling industry into large mills, and an increase in the size of the mills. Minnesota is an especially good example of this tendency, for with the largest output of any state in the country, it is surpassed in the number of mills by the states of Illinois, Indiana, Kansas, Kentucky, Michigan, Missouri, New York, Ohio, Pennsylvania, Tennessee, and Virginia, and equaled by Wisconsin.

Production by cities. As a rule, the states which have the greatest output have in them a city whose out put is rather great, as is shown by the following table.[3]

City.	Barrels in 1911.
Minneapolis	15,501,230
New York	2,000,000
Kansas City	1,822,000
Toledo	1,352,700
St. Louis	1,055,416
Chicago	1,027,600

2. Report of the 1900 Census, Vol. 9, Pt. 3, Page 35.

3. Report of the St. Louis Mchts Exchange, 1911.

Wheat used on the farm. Most people do not realize the great amount of wheat that is used on the farm, and which never enters into trade out of the immediate neighborhood. This has been shown to be about 43% of the total crop of the country. A part of this goes to feed the farmers family, being ground by the local miller. The amount of this so used is indefinite. At the rate of one and one half bushels per acre, it took about 70,000,000 bushels of wheat to seed the crop of the year 1912. This will run, on the average, about one tenth of the crop, for the average yield per acre is about fourteen bushels per acre, or perhaps a little less. The average yield per acre for the whole country for 1910 was 13.9 bushels, for 1911, 12.5 bushels, and for 1912, 15.9 bushels.[4]

Wheat is also used to some extent for the feeding of stock. If the grain is of poor quality on account of weather conditions during the growing or harvesting seasons, it is often more profitable for the farmer to feed the wheat to his stock than to sell it at the discount that he must suffer. This discount is just, however, for wheat that is damaged to any great extent is not good for flour. Wheat that is threshed wet is hard to handle, and grain dealers will not do so except at a very great discount. The writer knows personally of a small amount of wheat that was bought damp during the threshing season, and which the dealer worked with for months before he was sure it would keep cool long enough to reach the market. It had to be moved from bin to bin, and run through a cleaner every few days to keep it from spoiling. This sort of wheat is good only for feed for stock, and should be used as such by the farmer who raises it. The amount of wheat so used cannot

4. Crop Reporter, Supplement, Dec. 23, 1912, Page 99.

be estimated definitely, but in some years it is rather large.

As we saw in the description of the process of milling, about thirty percent of the wheat that is ground comes out as bran and midd ings. These products are used for feeding cattle and hogs. Altnough they are side products of the flour milling business, they are important products, and their value in the course of a year will run into the millions of dollars.

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McClures Magazine, Vol. 14, Page 130.

OUR EXPORTS AND AMERICAN WHEAT IN FOREIGN COUNTRIES.

Amount of exports. Our exports of wheat have fallen off materially in the last decade, as can be seen from the following table:[1]

		Amount exported.		
Year	Production	Wheat	Flour as wh.	Percent exp.
1900	522,229,505	132,060,667	83,929,405	41.36
1901	748,460,218	154,856,102	79,916,414	31.37
1902	670,063,008	114,181,420	88,724,178	30.28
1903	637,821,835	44,230,169	76,497,444	18.92
1904	552,399,517	4,394,402	39,718,507	7.99
1905	692,979,484	34,973,291	62,635,716	14.09
1906	735,260,970	76,569,423	70,131,002	19.95
1907	634,087,000	100,371,057	62,672,611	25.71
1908	664,602,000	66,923,244	47,345,224	17.19
1909	737,890,000	46,679,876	40,804,442	12.78
1910	635,121,000	23,739,302	45,582,458	10.91

The production is given for the sake of comparison. We see that the percentage of thetotal crop exported as well as the actual number of bushels has decreased in the last ten years. The exports of flour have decreased, but not nearly so fast as the exports of wheat. This shows the tendency of the country to become a manufacturing country rather than an agricultural one.

The ports. The ports exporting wheat are mostly on the Atlantic coast, as has been said before. Following is a list of the principle ports of the country, with their exports of wheat and wheat flour in 1911:[2]

Port.	Bushels of wheat.	Barrels of flour.
New York	7,343,573	3,587,628
Baltimore	5,382,758	994,591
Puget Sound	3,434,783	2,234,308
Philadelphia	3,283,341	982,354
Boston	1,432,599	389,252
Chicago	879,700	22,441
San Francisco	674,404	302,510
New Orleans	602,417	679,156
Duluth	368,305	92,803
Galveston	219,347	375,894
Mobile		533,293
Norfolk		64,982
Portland		15,487
All others	7,880,747	773,654

1. Yearbook of the Dept of Agr. 1911. 2. Rep. St. L, Exc. 1911.

The principle western port, Puget Sound, comes third in the list of wheat exporters, and second only to New York in the list of flour exporters. However, almost all the wheat that is shipped from the Pacific coast goes through Puget Sound. As we said in the description of the trading in wheat in the primary markets, most of the wheat on the Pacific coast is handled in sacks. This makes the loading of ships a laborious task. The first wheat was shipped from California to England in 1860; the English millers at first did not know how to handle the wheat, but they soon found the way, and got over the difficulty. On account of the long haul, most of the wheat shipped from the Pacific coast goes in sailing vessels. The Panama Canal will probably help in this respect, for it will cut off several thousand miles of the way to England. The development of the Eastern trade, together with the development of transportation facilities and the Panama Canal may have the effect of increasing the production of wheat on the Pacific coast; on the other hand, if Manchuria ever develops as a wheat raising country, the trade of our western coast will be seriously affected. At the present time there are three hundred and fifty ships engaged in the trade on the Pacific Ocean, and sixty five percent of them are under the English flag.

New York, Baltimore, and Philadelphia are the principal ports on the Atlantic coast; almost all the wheat exported from these ports goes to Great Britian, and a very small percent gets out of Europe.

Method of trading in wheat for export. Almost the same description as was given for the trading in the primary markets could be given for trading in wheat for export. The exporter

goes into the primary market and buys wheat, which he orders shipped to the seaboard, where it is stored in his elevator until the ship arrives, or a ship load is accumulated. The grain is sold abroad in much the same way as it is sold in the primary market. The exporter sends word to his agents abroad that he wishes to sell a certain amount of wheat; the broker, say in Liverpool, goes to the board of trade and sells the amount for future delivey.

Transfer elevator. The transfer elevators, as used on the lakes, as well as the seaboard, are merely elevators built for transferring grain from cars to ships, or from one ship to another. They are usually owned by the grain dealer, but they may be owned by the rail road company. These elevators unload grain from the same way as the storage elevators, described above; when unloading ships, an elevator leg is lowered into the hold, then when it becomes necessary, men shovel the wheat into the boot of the elevator. In New York, much of the grain is carried out in barges to the ships, which anchor farther out in the harbor; the wheat is transferred by floating elevators to the ships. These floating elevators are much the same as other elevators, except for the fact that they are on ships.

Import duties of the various countries. The different countries have different policies with regard to duties on imports into their countries. Three European countries, England, Holland, and Denmark, admit wheat without duty. The duty on wheat and wheat flour into most of the other countries is prohibitive. France has a duty that can be varied according to the demand for the product in that country. Below is a list of the import duties or wheat charged by the principal countries:

Country	Duty on flour per bbl.	Duty on wheat per bu.
Austria-Hungary	$2.66	$0.34
Belgium	.33	Free
Canada	.60	.12
Denmark	Free	Free
France	1.87 @ 2.73	.36
Germany	2.17	.36
Greece	1.58	.39
Holland	Free	Free
Italy	1.89	.37
Mexico	.10	.03
Norway	.47	.04
Portugal	Prohibited.	
Roumania	1.51	.00 1/4
Spain	2.38 and .68	.42 and .13
Sweden	1.51	.26
Switzerland	.33	.01
U.S.A.	25% ad.	.25

3.

It has been estimated that thirteen percent of the wheat grown in the world enters into the export trade; some countries are always exporters of wheat, and some are always importers. The countries of the world may be classified as follows:

4.

The usual wheat exporting countries:

Canada,
Argentina
Uruguay
United States
Austria-Hungary
Bulgaria
Roumania
Russia
Turkey
British East India
Australia
North Africa

The usual wheat importing countries:

Belgium
Denmark
France
Germany
Greece
Italy
Holland
Portugal
Spain
Norway and Sweden
Switzerland
Great Britain
Japan and China.

As can easily be seen, the chief importing countries are those of western Europe, where the population is very dense.

3. From Report of the Mchts. Exch. of StL Louis, 1907.

4. From Report of the Industrial Comm. Vol. 6, Page 42.

Production of the world. It might be interesting to see what countries raise the wheat of the world; the following table shows the production of the world by countries in 1911:[5]

Country.	Bushels, 1911.	Country.	Bushels
Austria-Hungary	192,000,000	Algeria & Tunis	40,874,000
Belgium	14,616,000	Argentine	145,981,000
Bulgaria	48,000,000	Australia	98,109,000
Denmark	4,469,000	Canada	215,851,000
France	315,444,000	Chili	18,000,000
Germany	149,411,000	Egypt	37,932,000
Greece	8,000,000	India	369,630,000
Holland	5,648,000	Japan	25,000,000
Italy	192,395,000	Mexico	12,000,000
Portugal	11,850,000	Persia	16,000,000
Roumania	90,886,000	Turkey	35,000,000
Russia	511,491,000	United States	621,338,000
Servia	13,000,000	Uruguay	6,000,000
Spain	148,495,000	Out of Europe	1,659,715,000
Sweden	7,945,000		
Switzerland	3,524,000	Grand total	3,459,360,000
United Kingdom	66,289,000		
Europe	1,799,645,000		

This tends to show the truth of the closing paragraph of W.C.Edgar, "The Story of a Grain of Wheat", "Wheaten bread is the universal food of civilization and whatever happens in the race for ascendency in the worlds markets, this seems assured: the Anglo-Saxon holds the key to the worlds supplies at the present, and is apt to hold it against all comers, at least during the twentieth century."

5. Yearbook of the Department of Agr. 1911, Page 529.

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